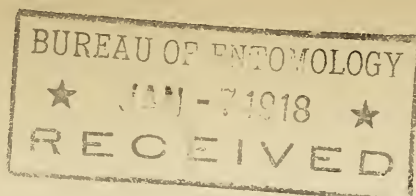


Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.



EMERGENCY ENTOMOLOGICAL SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE

Reporting cooperation between Federal, State, and Station

Entomologists and other Agencies.

Number 10. Washington, D.C. January 5, 1918.

CONTENTS.

Report of the Federal Horticultural Board.

Reports of Sections of the Bureau of Entomology.

Reports from State Officers and other correspondents
arranged by States.

FOREWORD.

Special attention is called to the reports found in this circular which deal with the pink bollworm and the sweet potato weevil.

The article by Mr. Geo. P. Gray on consumption and cost of economic poisons in California deserves careful reading.

Attention is also directed to Mr. E.N.Cory's suggestion as to the disposal of manure from army cantonments.

Insect conditions are of course quiet in most of the states.

REPORT OF THE FEDERAL HORTICULTURAL BOARD.

The pink bollworm situation in Texas remains much the same as reported last month. There have been assembled under the direction of Doctor Hunter, for the cleanup work about Trinity Bay, nearly forty men of technical training and a labor contingent varying from several hundred to two or three thousand. Mr. Busck has made a second trip to Texas and Mexico to see, at first hand, the actual conditions about Trinity Bay and particularly to investigate a large ranch in Mexico at Santa Monica, nearly opposite the Port of Del Rio. This ranch was known to have been planted with seed from the Laguna and proved, as anticipated, to be badly infested with the pink bollworm. In accordance with the general scheme of control, it is anticipated that the cessation of the growth of cotton in this ranch can be brought about in cooperation with the owner.

The research station in Mexico, alluded to in the last number, has been definitely established under the leadership of Mr. Busck. Commissions for this work have already been approved by the Secretary

in relation to Mr. Busck and Mr. Eduardo G. Tejada, a citizen of Mexico who will be in charge of the station. Two or three additional technical assistants will be provided, one of whom, Mr. Loftin, already has been appointed. This station will be a cooperative one between the Board and the Bureau of Entomology.

The reorganization of this work has led to the closing of the official station at San Antonio. The headquarters will be at Beaumont until the Trinity Bay emergency has been fully met.

The proposed sweet potato and yam quarantine as to foreign countries, referred to in the November number of this publication, was approved and promulgated by the Secretary of Agriculture December 18, 1917, effective January 1, 1918, and is therefore now in force. It prohibits the importation for any purpose of any variety of sweet potato or yam (Ipomoea batatas and Dioscorea spp.) from all foreign countries and localities. This quarantine, however, does not apply to the Territories of Hawaii and Porto Rico. Covering these two territories a domestic quarantine has been issued of the same date, effective January 1, forbidding the movement of sweet potatoes or yams of any variety from these territories into or through any other Territory, State, or District of the United States.

C.L. Marlatt, Chairman.
January 2, 1918.

REPORTS OF SECTIONS OF THE BUREAU OF ENTOMOLOGY.

Truck Crop Insect Investigations.

In No. 9 of the Emergency Entomological Service Monthly Letter, dated December 3, 1917, the statement was made under the writer's signature, page 7, paragraph 4, that the sweet potato weevil (Cylas formicarius Fab.) was permanently established in Duval County in Florida. The facts are simply these: That we have record of the occurrence of this insect at Jacksonville, Florida, made by the late Dr. Ashmead, who resided in Florida for many years, in 1880, but Prof. Wilmon Newell, Plant Commissioner, State Plant Board of Florida, informs us that the species does not occur in Jacksonville, which is located in Duval County. Mr. C.H. Popenoe writes under date of December 8, 1917, that about December 6, he visited Jacksonville, spending a portion of the morning in examining a stock of sweet potatoes at a local produce house including some tubers from Milton where the weevil was reported to have damaged the crop severely but without any information of its presence in Duval County. From this it would seem that when Ashmead recorded this species as occurring in Jacksonville it had not actually established itself there or, if so, it has since become extinct in that vicinity; certainly we have no information of its permanent occurrence in Duval County at the present writing.

Additional localities have been added through the services of Mr. K. L. Cockerham, he having found the species on no less than twenty-one farms in Mississippi at Waveland, Lake Shore, Ansley, Logtown, Gainsville, Ocean Springs, and Pascagoula. The last two localities are in Jackson County. Harrison County which lies between Hancock and Jackson Counties, on the Gulf of Mexico, has not been invaded so far as can be learned although two localities have been visited, Gulfport and Biloxi, lying directly on the coast. If additional observations should be made in the latter county and found to be free of the pest it is evident that the species has taken a "commercial jump" and been introduced by seed stock or by tubers introduced for food, probably from Hancock to Jackson County.

The Curly-top Leafhopper and Potato Tuber Moth in California in December. - Mr. C. F. Stahl reports that experiments are being conducted in the greenhouse at the present time where the temperature is much warmer than it is outside. Typical symptoms of curly-top develop rapidly on buckwheat but have not appeared on beets growing under the same conditions as the buckwheat. Tests are now being carried on to determine whether or not the beets are diseased and do not show the symptoms. Only insects which have been carefully watched are being used in these experiments.

So far adults of the curly-top leafhopper (Eutettix tenella Baker) have shown no tendency to hibernate although we have had some rather cold nights. It has always been warm enough in the middle of the day for them to be active. Adults collected at Corcoran, Calif., July 20, are still ovipositing and the eggs are hatching. Beets have already been planted at Chowchilla, Calif., and were just coming through the ground. These beets were planted on preirrigated land and are the first beets to be planted this early in this part of the valley. If harvested early enough during the next summer this method of planting seems to be very good and it will be interesting to note the effect of curly-top on such beets. Some of the injury attributed to curly-top during the month of August in the San Joaquin Valley was caused by the heat.

There has been a little increase in the numbers of parasites of the potato tuber moth (Phthorimaea operculella Zell.) which have emerged during the last few days. Eggs of the moths kept in cages on the potato plants are hatching and it will not be long before an abundance of material will be on hand to feed any parasites which are successfully reared.

Mr. Cole reports that the asparagus beetle (Crioceris asparagi) is not scattered over any great area as was first reported. Mr. Werner, the county agent of Clackamas county found it on the estate of Mr. Davis at Gresham. Gresham is a great trucking district and is, I believe, about twenty miles from Portland. This is the first year the beetles have been noticed and they occurred in large numbers on this one place.

The strawberry root-weevil (Otiorhynchus ovatus L.) is very bad at Gresham and Mt. Tabor, or has been during the past year. Both O. ovatus and O. sulcatus are becoming dangerous pests on the Wilton-Freewater project in Eastern Oregon. The so-called barrier method of control was tried out at this place in combating the weevils. One orchard was flooded for three days but with no good results. Some of the plants were

The first of these is the fact that the
the second is the fact that the
the third is the fact that the
the fourth is the fact that the
the fifth is the fact that the
the sixth is the fact that the
the seventh is the fact that the
the eighth is the fact that the
the ninth is the fact that the
the tenth is the fact that the

the eleventh is the fact that the
the twelfth is the fact that the
the thirteenth is the fact that the
the fourteenth is the fact that the
the fifteenth is the fact that the
the sixteenth is the fact that the
the seventeenth is the fact that the
the eighteenth is the fact that the
the nineteenth is the fact that the
the twentieth is the fact that the

the twenty-first is the fact that the
the twenty-second is the fact that the
the twenty-third is the fact that the
the twenty-fourth is the fact that the
the twenty-fifth is the fact that the
the twenty-sixth is the fact that the
the twenty-seventh is the fact that the
the twenty-eighth is the fact that the
the twenty-ninth is the fact that the
the thirtieth is the fact that the

the thirty-first is the fact that the
the thirty-second is the fact that the
the thirty-third is the fact that the
the thirty-fourth is the fact that the
the thirty-fifth is the fact that the
the thirty-sixth is the fact that the
the thirty-seventh is the fact that the
the thirty-eighth is the fact that the
the thirty-ninth is the fact that the
the fortieth is the fact that the

the forty-first is the fact that the
the forty-second is the fact that the
the forty-third is the fact that the
the forty-fourth is the fact that the
the forty-fifth is the fact that the
the forty-sixth is the fact that the
the forty-seventh is the fact that the
the forty-eighth is the fact that the
the forty-ninth is the fact that the
the fiftieth is the fact that the

the fifty-first is the fact that the
the fifty-second is the fact that the
the fifty-third is the fact that the
the fifty-fourth is the fact that the
the fifty-fifth is the fact that the
the fifty-sixth is the fact that the
the fifty-seventh is the fact that the
the fifty-eighth is the fact that the
the fifty-ninth is the fact that the
the sixtieth is the fact that the

the sixty-first is the fact that the
the sixty-second is the fact that the
the sixty-third is the fact that the
the sixty-fourth is the fact that the
the sixty-fifth is the fact that the
the sixty-sixth is the fact that the
the sixty-seventh is the fact that the
the sixty-eighth is the fact that the
the sixty-ninth is the fact that the
the seventieth is the fact that the

sprayed with lead arsenate but this only seemed to drive the weevils to other parts of the plant or to other plants.

The strawberry leaf-roller is causing damage in the Walla Walla Valley. The Colorado potato beetle has gained a good deal of territory around Hermiston this past year, spreading on a wild solanaceous plant. The asparagus miner which was present in California several years ago has not found its way to Oregon so far as I can learn.

Mr. Marsh sent in some cull onions from Colorado which were infested by the onion thrips (Thrips tabaci Lind.) stating that the culls are left standing in the field or thrown together in heaps and the thrips live through the winter on them. In this locality only adults survive the winter. They are very resistant to cold and I have seen them when they were unharmed by a temperature 20 degrees F. below zero. Except for a few wintery days during the latter part of October the weather this season has been mild and nymphs as well as adults are still active on the onions left in the field.

Porto Rico Mole Cricket in Georgia. Mr. Popenoe writes, "I have recently received information from Cumberland Island and Kingsland, Camden County, Georgia, that what from the description is the Porto Rican mole-croquet (Scapterisus didactylus Latr.) is seriously injuring young cabbage, radish, and other truck crops there".

Mr. Campbell reports as follows from the Alhambra, Calif., Station: "The pea aphid (Macrosiphum pisi Kalt.) is present, but not in sufficient numbers to do noticeable damage. The dry weather, continuing to date with no rain, together with several warm dry desert winds has kept this pest in check.

The cabbage aphid (Aphis brassicae Linn.) has been reported from a number of localities as being unusually bad. Ordinarily, rains and cold weather hold it in check but owing to the lack of both these, the aphid has become abundant. In some cases the cabbage is being sprayed with nicotine sulphate 40%, 1 pint to 200 gallons, and soap 4 pounds to 100 gallons.

The bean aphid (Aphis rumicis Linn.) is still present on broad beans in a number of citrus orchards but does not seem to have increased much since November.

F.H. Chittenden

INSECTS AFFECTING THE HEALTH OF ANIMALS.

Ox warbles are appearing in numbers under the skin on the backs of cattle somewhat earlier than usual. They also appear to be somewhat more abundant than normal. These statements are based on examinations in the vicinity of Dallas and southwest Texas. The same condition may not prevail further northward but where extraction work is contemplated it would be well to take into account the possibility of abnormal early maturing of the larvae.

F.C. Bishopp,

REPORTS FROM STATE OFFICERS AND OTHER CORRESPONDENTS
ARRANGED BY STATES.

CALIFORNIA.

The Consumption and Cost of the Economic
Poisons in California.

"When the College of Agriculture undertook a survey of the agricultural resources of the state, it seemed that the facilities of the Insecticide and Fungicide Laboratory could be advantageously utilized in addition to its usual functions, by acting as a clearing house for information on the supply and demand of insecticides and fungicides, primarily, as well as of other economic poisons. The recent acute shortage of sodium cyanide, as well as the prevailing high prices of all other economic poisons, served to illustrate the probability of an even more serious condition following the greater demands entailed by the contemplated more intensive agricultural methods and the planting of increased acreages. The first matter for consideration appeared to be the obtaining of data on the normal consumption in the state of the economic poisons and an estimate of increased demands in the future.

The county horticultural commissioners unanimously promised their cooperation and agreed to furnish through the State Commission's office an estimate of the normal consumption of economic poisons in their respective counties.

The acreage of fruits in the twenty-eight counties reporting (arbitrarily assigning 2000 acres to Marin and San Mateo Counties, for which no report is available) amounts to 599,182 acres. There is thus represented in the reports of the twenty-eight counties 71.67% of the total acreage of fruit (exclusive of grapes).

If, however, the consumption of economic poisons is roughly proportional to the acreage of fruits, it may be estimated that the total consumption for the entire state amounts to very nearly two and one-half million dollars annually. It is believed that this is a very conservative estimate.

It is estimated that during the year 1916, when the shortage of sodium cyanide was acute, some \$60,000 was spent in the purchase of substitutes for fumigation in the counties reporting. These items have been classified as follows:

Useless "Remedies"	\$26,858.
Proprietary Petroleum Insecticides	21,030.
Soap Powders	<u>13,053.</u>
Total	60,941.

It is interesting to note that at least half or probably more of this amount was money absolutely wasted. This, however, is not the most serious aspect of the case. Many records are on hand of very serious injury to both fruit and foliage of citrus trees resulting from the use of unknown and untried preparations.

THE UNIVERSITY OF CHICAGO
LIBRARY

THE UNIVERSITY OF CHICAGO
LIBRARY

THE UNIVERSITY OF CHICAGO
LIBRARY

THE UNIVERSITY OF CHICAGO
LIBRARY

THE UNIVERSITY OF CHICAGO
LIBRARY

THE UNIVERSITY OF CHICAGO
LIBRARY

GENERAL CONDITIONS OF THE INSECTICIDE MARKET.

Arsenicals: The wholesale price of arsenic trioxide (the raw material for the production of all compounds of arsenic) was about three or four cents per pound at the beginning of the war. During 1915 and 1916, the price ranged from eight to eleven cents per pound, and in the fall of 1916, rapidly advanced to seventeen and twenty-three cents. A further advance was anticipated by the majority of the wholesalers handling this material. The statement was made by some that supplies were difficult to obtain. One firm anticipated a drop. The price last given above has been steadily held for more than a year.

The reasons commonly assigned for the high price of arsenic is the fact that the importations, which usually amount to about three thousand tons annually, have been stopped, thus depleting the stocks on hand and severely taxing the output of domestic producers, which is normally about equal to the importations. According to the United States Geological Survey, arsenic trioxide is practically all produced as a by-product from smelter smoke in some of the western states. It is believed that many times more than the normal consumption of arsenic in the United States can be produced as a by-product from smelter smoke and that the high price of arsenic is artificial.

Copper Sulfate: The price of this raw material for the preparation of copper fungicides is about fifty percent above normal. The great demand for copper during the war will hold the price high. Sulfur fungicides have been substituted for copper compounds to a large extent when possible.

Sulphur: The price of sulphur has been steadily increasing and is now about one hundred percent above normal. Reliable information indicates that this country may face an actual shortage of sulphur. Enormous quantities of pyrites are used in the manufacture of sulphuric acid, much of this is being imported from Spain. Importations have ceased so that the sulphuric acid plants are obliged to use sulphur or obtain a local supply of pyrites. The American producers of sulphur are developing new deposits and it is reported that promising deposits of pyrites are being investigated by the government so that production may meet consumption.

Sodium Cyanide: A shortage of sodium cyanide for fumigating and other purposes occurred during the fumigating season of 1916. There was an ample supply during the present season owing to the output of new plants which started operations.

Petroleum Oils: The supply of these materials, commonly used as insecticides, seems to be ample, although the price is higher than normal. Complaints have been made that some of the oils supplied this year are more difficult to emulsify than usual, particularly the crudes.

Rodent Poisons: Strychnine is selling at about two hundred percent higher than normal. Saccharine is now being quoted at over fifty dollars

per pound and is very difficult to obtain. The latter is a coal-tar product, the manufacture of which has not been carried on to any great extent in this country. Some other equally effective but cheaper "camouflage" for use in squirrel poisons is very much needed.

The price of carbon bisulphide has not risen in proportion to that of most of the other economic poisons. There appears to be no reason to fear any great advance in price.

Increased Consumption: The Commissioners were asked to give an estimate of the probable increased consumption of the economic poisons. Not enough of the Commissioners, however, were willing to venture an estimate for one to be able to see the future in this respect. The agriculturist has so many problems staring him in the face: labor, high prices of supplies, marketing, etc., that he, himself, is scarcely able to predict whether or not his efforts at pest control will have to be relaxed, as we get deeper and deeper into the war, or whether this vital factor in the production of foods can be given greater attention.

It is quite certain that the consumption of rodent poisons, strychnine, saccharine, carbon bisulphide, etc., will be enormously increased during the next year. In the interest of the public health, and in the conservation of the agricultural resources of the state, all Government, State, and County organizations concerned are making a united and special effort in a state-wide campaign against the ground squirrel.

It seems quite unlikely that the consumption of the other economic poisons in the future will be less than in the past. In fact, there are many reasons for anticipating a greater consumption if the prices do not become prohibitive and the farmer is not unduly exploited by the "profiteer". The coming into bearing of new acreages of fruit, more extensive inter-cropping, and higher prices for farm products, are all facts which point in this direction. Furthermore, the prevailing high prices of such produce as beans, wheat, etc., which heretofore had been so low as to discourage, in a large measure, the control of pests, will now make profitable the use of control measures which are ordinarily unprofitable.

Geo. P. Gray

FLORIDA.

The only insects that seem to be more common than usual in Florida are aphids, especially Myzus persicae, which are doing considerable damage to cabbage and other plants. This apparently is due to the fact that we have had a month of unusually cold, damp weather which has affected the parasites and predatory insects which usually keep the aphids in check at this time of year. Cut worms are, of course, as active as usual and so is the cabbage looper.

J.R. Watson,
December 27, 1917.

GEORGIA.

An outbreak of sweet potato weevil has occurred in the southern part of Charlton County, Georgia. The infestation is confined to about one dozen farms. Inspections in other counties thus far have failed to reveal the presence of this insect.

The damage to crops in Georgia by the Mexican Cotton Boll Weevil and other insects has not been as great as ~~was~~ anticipated. The damage to the sea island cotton in Lowndes and adjoining counties amounted to fifty to seventy-five percent. The advance of the boll weevil for the season was greater in the northern counties of Georgia than in the southern counties.

Nezara viridula, which was responsible for such serious damage to cotton, food and forage crops in 1916 did almost no damage in 1917.

E. Lee Worsham,
December 26, 1917.

LOUISIANA.

Since the closing days of October, this section has experienced at least four very sharp drops in temperature, and as low as 20 degrees F. has been registered in territory reaching to the coast. This has had the effect of checking insect damage to some extent, and for the present, at least, it might almost be said that an interregnum has been established as far as field insects are concerned. The check, however, has not been absolute, and any sharp upward turn of the thermometer has been followed by flights. This was particularly the case with the common cabbage butterfly (Pontia rapae). This form was very common from November 8 to 17 when 77 degrees were registered. The species has also been noticeable in the truck gardens since, and on December 22 it was quite numerous together with the two Sulphurs, Eurema euterpe and Callidryas eubule, the latter seeking the greenhouses.

Early in November, swarms of the larvae of Hyphantria cunea or Textor were noticed in St. Tammany Parish seeking the underbrush skirting the streams. Forest fires had occurred in the neighborhood. Considerable damage has been done to young pecan trees in this parish by this webworm. Older trees in some measure recovered from their defoliation.

The above period of rise in temperature was accompanied by a marked increase in the mature forms of the White Fly (Aleurodes citri). The Florida red scale (Chrysomphalus ficus) has been somewhat affected by the repeated freezes, especially where they had been present on Ligustrums. On sweet olive, orange and bays, the drop in temperature seems to have had little effect. Icerya purchasi has been little affected beyond a checking of development, and this is not in every case.

CHAPTER I

The first part of the book is devoted to a general survey of the subject. It begins with a definition of the term "philosophy" and then proceeds to a discussion of the various branches of the subject. The author then discusses the history of philosophy, from the ancient Greeks to the modern era. He then discusses the various methods of philosophy, from the deductive method to the inductive method. Finally, he discusses the various schools of thought, from the Stoics to the moderns.

THE PHILOSOPHY OF NATURE

The second part of the book is devoted to the philosophy of nature. It begins with a discussion of the various branches of natural philosophy, from physics to astronomy. The author then discusses the various methods of natural philosophy, from the deductive method to the inductive method. Finally, he discusses the various schools of thought, from the ancient Greeks to the moderns.

The writer thus far has noticed only a few cases of damage to stored sweet potatoes and yams by the weevil Cylas formicarius. Hitherto, no very large stocks have been carried here, the market relying mainly on daily supplies coming in from the growing sections. The increased production may change this method and receivers have been advised to watch carefully stocks coming in.

In regard to the rice weevil (Calandra oryzae) and Rhizopertha dominica little damage has been hitherto noticeable to new crop rices before the middle of October, the maximum damage occurring about the end of May and the month of June. Stocks here are very light and owing to the heavy demand, the rough product is being milled out and fed to the distributor as fast as possible, leaving but little for storage outside of choicer grades for seed. The increasing importance of this port as an export point together with the increase in elevator accommodation will naturally call for increased vigilance in the matter of all cereals and food products.

Ed. Foster,
December 27, 1917.

MARYLAND.

At the suggestion of the writer, Mr. R.H. Hutchison, with whom I have been cooperating on the house fly problem, visited a New York firm selling dry horse manure and ascertained their methods. Later the writer visited a fertilizer company using the same method on peat and the firm that manufactured their machinery to ascertain the practicability of applying their methods to house fly control. The method was found feasible but costly for the individual as the installation of the rotary drum for drying cost in the pre-war time about \$6,000.

As state entomologists are partly responsible for the public health it seems pertinent at this time to point out a situation which has many responsibilities and opportunities.

Entirely aside from the dangers due to flies in army cantonments, the presence of such breeding places will be a grave menace. It is practically certain that the military authorities will care for the soldiers, but if the usual methods are adopted in respect to manure disposal, one of two things is likely to happen; either the manure will be destroyed or rendered unfit as a fertilizer or the civil population will likely suffer from the flies which emerge from the manure after it has been shipped to a distance from the camp.

What seems an entirely feasible plan is herein proposed. At each cantonment install a large rotary dryer. Dry the manure and distribute it through the help of the National Fertilizer Association at a cost plus percentage basis thus relieving the soldiers and civilians of the menace of flies and providing for the farmer a source of fertilizer in the time of scarcity. Moreover the number of cars required to handle this material will be greatly reduced from the number required under the old plan to handle daily the fresh manure produced at each camp.

At one camp shelters for 10,000 horses are provided; 10,000 horses will produce 10,000 bushels of manure weighing approximately

6000,000 pounds or 300 short tons. This will require ten cars loaded with 30 tons for its removal. By drying to 80% of the moisture content which is approximately 80% of the total weight only 108 tons of the dry fertilizer would be left to be hauled, requiring only $3\frac{6}{10}$ cars. If cars were not available at once the material could be held indefinitely without danger of fly breeding.

E.N.Cory,

December 29, 1917.

MISSISSIPPI.

During the past month Mr. K.L.Cockerham of the Bureau of Entomology has found the sweet potato weevil, Cylas formicarius, on several farms in Hancock County and on three farms in Jackson County. Harrison county is the only other county in Mississippi bordering on the Gulf of Mexico. In this county so far none of these insects have been found, but it is more than likely that the species occurs in that county as it is located between Hancock and Jackson counties. Searches for the weevil in Pearl River and other Mississippi counties have so far given negative results.

The "Spray Your Orchard" campaign in Mississippi has been very successful. Spraying demonstrations have been given in at least 75 of the 81 counties of Mississippi, and in many of these counties a large proportion of the fruit trees have been sprayed. As the weather conditions were very unfavorable during the week of December 9 to 15, that was set for the final drive, it has been decided to have another "Spray Your Orchard Week" from February 3-9, 1918.

R.W.Harned,

December 22, 1917.

NEW YORK.

A summary of reports recently at hand from many of the counties of New York State indicate a comparative scarcity of . San Jose scale in most localities due, in the majority of cases, in the opinion of the practical fruit growers, to thorough spraying, though in some sections the insect has not multiplied greatly even in unsprayed orchards. This latter is frequently marked in the Hudson Valley. There are exceptions to the above, a serious infestation being reported in the City of Hornell, Steuben county, due probably to English sparrows serving as carriers. The pest is reported as becoming serious in Chautauque county, while there is said to be a great neglect of spraying by all fruit growers.

The potato aphid outbreak of last year resulted in considerable damage, especially in the lower Hudson Valley, and the recurrence of this insect in numbers another season is greatly feared by many growers.

The potato flea beetle was abnormally abundant and injurious

in Dutchess county last year and was undoubtedly an important factor in promoting blight infection.

Fall webworm and the late feeding caterpillars, especially the red-humped apple worm and the yellow-necked apple worm, were so abundant last year that they have aroused considerable interest as to the control measures which should be employed another season.

The seed corn maggot work upon beans in the western part of the state was due, it is pretty generally agreed, to unfavorable climatic conditions which, in some instances, were accentuated by too deep planting. There is naturally some apprehension as to a recurrence of the trouble another season and we are pointing out that in the main modified culture is the most promising means of control.

Onion thrips is reported from Orange county as one of the more important insect problems and this is doubtless true of other onion growing sections.

The need this winter, as it now appears, is to ascertain the important insect problems for each locality and to see that those especially interested therein are well informed as to the most effective and economical methods of handling the situation. The scarcity of labor, the high prices and possible scarcity of spray materials suggests the desirability of reducing spraying schedules to the practical minimum.

E.P. Felt,
December 15, 1917.

The Evetria buoliana has been found locally at four different points in the state, mostly on Long Island where two-needle pines have been largely involved. Eradication will require constant attention and annual inspection.

The Cherry Ermine Moth was first discovered four years ago on imported French apple seedlings and its life history has been fully worked out by Professor Parrott of the Experiment Station. Annual inspection is required and during 1917 upwards of ten thousand webs have been discovered in four localities in the state. At two points, insects were found for the first time in orchard trees.

At two points, Hemerophila pariana has been found near the lower Hudson in apple orchards. Serious injury to the foliage has resulted late in the season and is important enough to require further attention for control.

Five years ago a few brown-tail moths were found on the eastern end of Long Island. Careful inspections at the time and since have shown no spread whatever. We believe at this time that there are no brown-tail moths in the State of New York as this colony and the one found six years ago in Westchester County are entirely eradicated.

The colony of gipsy moths found at Geneva six years ago was thoroughly eradicated the same year and no evidence of infestation has been discovered since.

The gipsy moth infestation found in Westchester County five years ago has been, we believe, entirely eradicated. This was believed to be true a year ago but as a precautionary measure our three large spray pumps were put into action and several acres of forest growth was fully sprayed last summer, since which time no evidence of

of gipsy moth has been found through the country about has been thoroughly scouted by our own inspectors in cooperation with the scouts under charge of Mr. L.H.Worthley of the United States Bureau of Entomology, whose cordial cooperation is hereby acknowledged.

Geo.G.Atwood,
December 24, 1917.

TENNESSEE.

Unusual attention is being directed to the pruning and spraying of the orchards in all parts of the state. Many of the mountain people in the eastern section of the state are becoming interested in spraying and there are several sections where spraying is being carefully carried on that heretofore gave little or no attention to the matter.

G.M.Bentley,
December 24, 1917.

1. The first part of the paper is devoted to a general discussion of the problem of the existence of solutions of the system of equations (1) for arbitrary values of the parameters α and β . It is shown that the system has solutions for all values of the parameters α and β if the function $f(x)$ is continuous and has a bounded derivative.

2. In the second part of the paper the question of the uniqueness of the solutions of the system (1) is considered. It is shown that the system has a unique solution for all values of the parameters α and β if the function $f(x)$ is continuous and has a bounded derivative.

3. In the third part of the paper the question of the stability of the solutions of the system (1) is considered. It is shown that the system has stable solutions for all values of the parameters α and β if the function $f(x)$ is continuous and has a bounded derivative.

4. In the fourth part of the paper the question of the asymptotic behavior of the solutions of the system (1) is considered. It is shown that the system has asymptotically stable solutions for all values of the parameters α and β if the function $f(x)$ is continuous and has a bounded derivative.

